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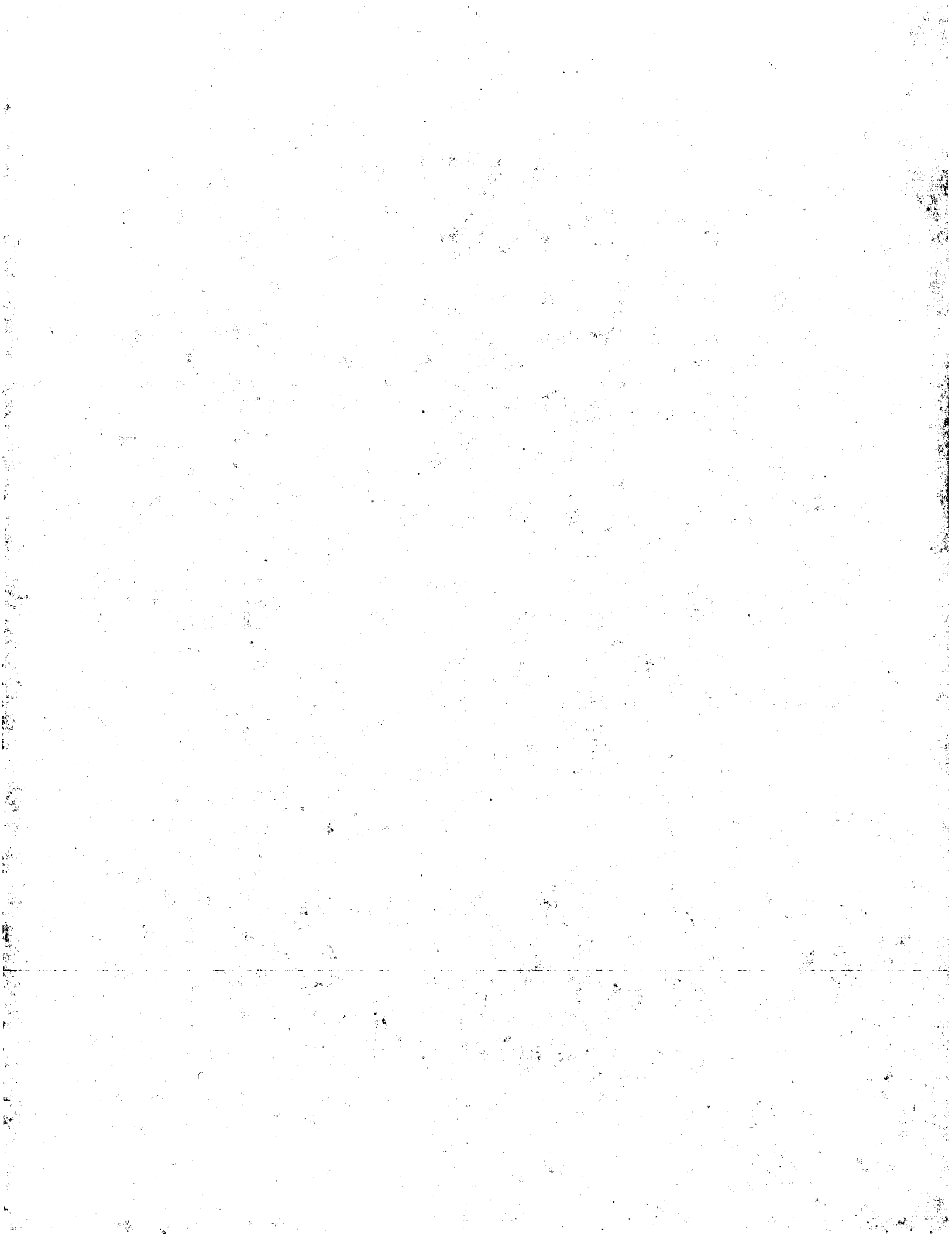
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WASHING METHOD AND AUXILIARY UTENSIL FOR WASHING

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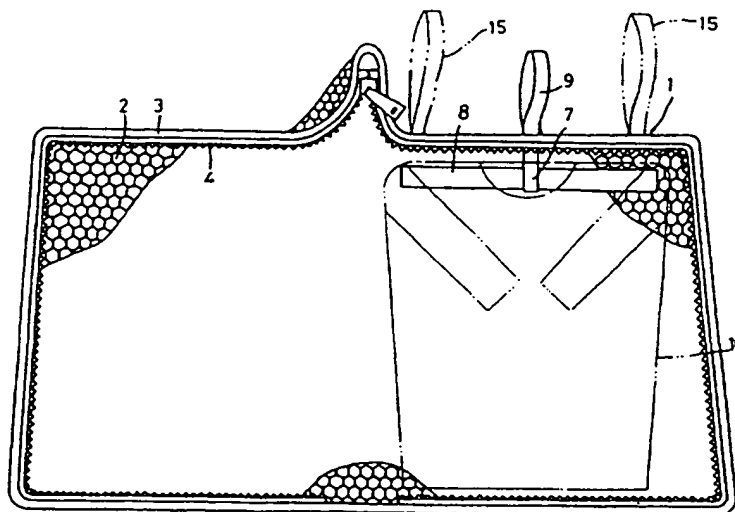
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#### Abstract

A washing method using a washing net, and an auxiliary utensil for washing. An article (10) being washed, and a water permeable member (2) capable of defining a space for receiving the article, are overlapped one upon another by receiving the article (10) in the space, and are integrally rolled while overlapped. The article (10) being washed, and the water permeable member (2) in a rolled state are washed with water by a washing machine. The water permeable member (2) comprises a flexible, front side net, and a flexible, rear side net (32) positioned with a spacing from the front side net, the front side net and the rear side net being connected to each other elastically and relatively displaceably.



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## Technical field

The present invention relates to a laundering method which washes laundry in a washing machine and an auxiliary utensil for laundry.

## Prior art

When washing laundry in a washing machine, a laundry net is used in order to prevent the laundry from losing its shape due to the water flow circulating within the washing machine.

As this laundry net, there is the spherical bag disclosed in Kokai Utility Model No. Sho 58[1983]-94480 and the semi-spherical bag disclosed in the gazette of Kokai Patent Application No. Hei 7[1995]-328279.

However, when laundry is stored in a spherical or semi-spherical bag and washed, the laundry may become unevenly biased or become rounded within the laundry net. Therefore, it is not possible to sufficiently prevent the laundry from losing its shape.

Also, as a washing machine which can prevent loss in the shape of the laundry, there is such a structure that laundry is placed on a net provided within the wash tub and water falls like a waterfall from the top of the laundry.

The conventional laundry net moves relatively with respect to the laundry on the inside part of the laundry net according to the impact received from the water flow or the centrifugal force received during the dewatering. Consequently, the laundry is abraded by the laundry net so damage, pilling, fuzz, etc., are generated, and loss in the shape of the laundry cannot be sufficiently prevented.

When water falls like a waterfall from the top of the laundry, loss in the shape of the laundry can be prevented but a special washing machine becomes necessary. Therefore, it is not possible to use a general purpose washing machine when washing laundry having a tendency for the shape to be lost, for example, a sweater for which dry cleaning is suggested, etc.

Furthermore, shrinking cannot be prevented in the conventional laundering method when the laundry is composed of fibers with a tendency to shrink.

Therefore, superimposing the laundry and the net by storing the laundry in a bag-shaped net, winding the net and the laundry into a roll shape in the superimposed state, and washing the laundry and the water-permeable member wound into a roll shape in a washing machine is disclosed in Kokai Utility Model No. Hei 5[1993]-13380.

However, the outermost peripheral section of the rolled laundry is abraded by the net if the laundry and the net are simply wound into a roll shape. Therefore, there is a problem of damage, pilling, fuzz, etc., being generated in the laundry.

The present invention aims to provide a laundering method and an auxiliary utensil for laundry capable of solving the aforementioned problems.

## Presentation of the invention

The laundering method of the present invention can be applied, even when washing the laundry and the water-permeable member in a washing machine in a state of having been wound into a roll shape, by superimposing the laundry and the water-permeable member (capable of composing a space for storing the laundry) by storing the laundry in this storage space and winding together into a roll shape in this superimposed state. Furthermore, it is applied when folding together the laundry and the water-permeable member so that at least one fold is created in the superimposed state and winding this folded laundry and the water-permeable member into a roll shape. Also, it is applied when washing the laundry and the water-permeable member in the folded state by superimposing the laundry and the water-permeable member (capable of composing a space for storing the laundry) by storing the laundry in the storage space thereof and folding together so that not less than two folds can be created in the superimposed state.

According to the present invention, the laundry is washed in a state of having been wound into a roll shape, in a state of having been wound into a roll shape after being folded so that at least one fold is created, or in a state of having been folded so that not less than two folds are created. Consequently, uneven biasing, becoming rounded, loss in shape, and shrinkage of the laundry can be prevented.

When only the laundry is wound into a roll shape, the inner circumferential side and the outer circumferential side of the laundry directly contact. Also, when only the laundry is folded, the mutually opposing surfaces of the laundry directly contact. Consequently, water flow reaching the center of the laundry becomes insufficient so sufficient wash force cannot be obtained. On the contrary, according to the present invention, the laundry is wound into a roll shape or folded in a state of having superimposed the laundry and water-permeable member. Therefore, a water-permeable member is interposed between the inner circumferential side and the outer circumferential side of the rolled laundry or a water-permeable member is placed between the mutually opposing surfaces of the folded laundry. Consequently, sufficient wash force can be obtained since water flow reaching the center of laundry becomes sufficient.

Furthermore, the laundry and the water-permeable member are wound together so the laundry is not abraded by the water-permeable member. As a consequence, generation of damage, pilling, fuzz, etc., in the laundry can be prevented.

Also, the water-permeable member can compose a storage space and, by storing the laundry in this storage space, the water-permeable member and the laundry are superimposed. The laundry and the water-permeable member are wound into a roll shape or folded in this superimposed state. Consequently, the water-permeable member is placed reliably between the inner circumferential side and the outer circumferential side of the rolled laundry or between the



mutually opposing surfaces of the folded laundry. Consequently, sufficient wash force can be reliably obtained.

One characteristic of the method in the present invention is in the point that the water-permeable member is constituted by coupling the net on the front surface which has flexibility and the net on the back surface which has flexibility and is arranged by providing a distance from the net on the front surface to be elastically displaceable with respect to each other.

According to this constitution, the front surface net relatively elastically displaces with respect to the back surface net when impact from the water flow or centrifugal force for dewatering functions on the water-permeable member which covers the outer most circumferential section of the rolled laundry or the outer most side of the folded laundry. Consequently, relative movement of the back surface net with respect to the laundry can be suppressed. As a consequence, the outer most circumferential section of the rolled laundry or the outer most side section of the folded laundry being abraded by the net can be prevented. Therefore, generation of damage, pilling, fuzz, etc., of the laundry can be prevented.

The coupling means for the net on the front surface and the net on the back surface is composed of multiple linear parts capable of flexing and deforming elastically and, by one end of each linear part being coupled to the net on the front surface and the other end of each linear part being coupled to the net on the back surface, both nets are made elastically displaceable with respect to each other and it is preferable for a space to be formed between the linear parts.

As a consequence, water flow can pass through the space between the net on the front surface and the net on the back surface so the washing effect can be improved.

Another characteristic of the method in the present invention is in the point that the water-permeable member is constituted from a net which has flexibility and multiple linear parts which are capable of elastically flexing and deforming and coupled to one surface of the net, a space is mutually formed between the linear parts, and each linear part is arranged on the inside part of the storage space so that contact can be made with the laundry.

According to this constitution, the net is relatively elastically displaced with respect to the linear parts when the impact from the water flow or the centrifugal force for dewatering functions on the outer most circumferential section of the rolled laundry or on the water-permeable member which covers the outer most side of the folded laundry. Consequently, relative movement of the linear parts with respect to the laundry can be suppressed. As a consequence, the outer most circumferential section of the rolled laundry or the outer most section of the folded laundry being abraded by the net can be prevented. Therefore, generation of damage, pilling, and fuzz in the laundry can be prevented. Also, the water flow can pass through the space between the linear parts so the washing effect can be improved.

It is preferable for the linear parts to be composed into a ring shape by the two ends being coupled to the net. According to this, the linear parts do not become hitched to the laundry so the laundry being abraded by the linear parts can be prevented. Therefore, generation of damage, pilling, and fuzz in the laundry can be prevented.

In the method of the present invention, it is preferable to wind the laundry and the water-permeable member into a roll shape with a core material as the central axis. In accordance with this, it is possible to easily wind the laundry and the water-permeable member into a roll shape.

According to the laundry method of the present invention, generation of loss in the shape, shrinkage, damage, pilling, and fuzz in the laundry can be prevented while maintaining sufficient washing effect. Also, a laundry which tends for the shape to be lost, for example, a sweater for which dry cleaning is suggested, etc., can be washed with a general-purpose washing machine.

The auxiliary utensil for laundry applied with the present invention is provided with a water-permeable member capable of composing a space for storing laundry, this water-permeable member has flexibility so the water-permeable member and the laundry stored in the storage space thereof can be wound together into a roll shape in the superimposed state, and a means is provided for preventing the laundry and the water-permeable member wound into a roll shape from unfolding. Furthermore, it is applied to an auxiliary utensil for laundry capable of folding the water-permeable member and the laundry together so that at least one fold is created in the superimposed state or to be wound into a roll shape in the folded state. Also, the auxiliary utensil for laundry applied with the present invention is provided with a water-permeable member capable of composing a space for storing laundry, this water-permeable member has flexibility so that the water-permeable member and the laundry stored in the storage space thereof can be folded together so that not less than two folds can be created in the superimposed state, and a means is provided for restricting the folded laundry and water-permeable member from unfolding.

One characteristic of the auxiliary utensil for laundry in the present invention is in the point that the water-permeable member thereof is constituted by coupling the net on the front surface, which has flexibility, and the net on the back surface, which has flexibility, and arranged by providing a distance from the net on the front surface to be elastically displaceable with respect to each other. As the thickness of the water-permeable member, more than 2.0 mm is favorable and 2.0-15.0 mm is preferable. The coupling means for the net on the front surface and the net on the back surface is composed of multiple linear parts capable of flexing elastically and by one end of each linear part being coupled to the net on the front surface and the other end of each linear part being coupled to the net on the back surface, the two nets are made elastically displaceable with respect to each other and it is preferable for a space to be mutually formed between the linear parts.

Another characteristic of the auxiliary utensil for laundry in the present invention is in the point that a water-permeable member capable of composing a space for storing laundry is provided, this water-permeable member has flexibility so that the water-permeable member and the laundry stored in the storage space thereof can be wound together into a roll shape in the superimposed state, a means is provided to prevent the water-permeable member and the laundry wound into a roll shape from unfolding, this water-permeable member is composed from a net which has flexibility and multiple linear parts which are capable of elastically flexing and deforming and coupled to one surface of the net, space is mutually formed between the linear parts, and each linear part is arranged on the inside part of the storage space so that contact can be made with the laundry. It is preferable for the linear parts to be composed into a ring shape by the two ends being coupled to the net.

In the auxiliary utensil for laundry in the present invention, it is preferable to be able to couple the core material of the water-permeable member so as to become the center axis when winding the water-permeable member and the laundry into a roll shape.

According to the auxiliary utensil for laundry in the present invention, the aforementioned laundering method in the present invention can be applied.

#### Brief description of the figures

Figure 1 is a frontal view in the unfolded state of the auxiliary utensil for laundry in the first embodiment of the present invention.

Figure 2 is a frontal view in the laundry stored state of the auxiliary utensil for laundry in the first embodiment of the present invention.

Figure 3 is a partial perspective view of the water-permeable member in the first embodiment of the present invention.

Figure 4(1) is a partial cross sectional view showing the state prior to the relative displacement of the net on the front surface and the net on the back surface in the first embodiment of the present invention and Figure 4(2) is a partial cross section view showing the state after the relative displacement.

Figure 5 is a perspective view showing the middle of winding the laundry and the auxiliary utensil for laundry into a roll shape in the first embodiment of the present invention.

Figure 6 is a perspective view of the laundry and the auxiliary utensil for laundry wound into a roll shape in the first embodiment of the present invention.

Figure 7 is a cross sectional view of the main part in the laundry and auxiliary utensil for laundry wound into a roll shape in the first embodiment of the present invention.

Figure 8 is a perspective view at the middle of winding the laundry and the auxiliary utensil for laundry into a roll shape in a modified example of the present invention.

Figures 9(1), 9(2), and 9(3) are figures showing the member for restricting the unfolding of the laundry and the water-permeable member in the variants of the present invention.

Figure 10 is a frontal view in the unfolded state of the auxiliary utensil for laundry in the second embodiment of the present invention.

Figure 11(1) is a perspective view of the laundry and the auxiliary utensil for laundry used in an application example of the present invention and Figure 11(2) is a perspective view of the auxiliary utensil for laundry used in an application example of the present invention.

Figure 12(1) is a photograph substituting for a figure showing the fiber shape on the front surface of a wool sweater washed according to the method in the present invention and Figure 12(2) is a photograph substituting for a figure showing the fiber shape on the front surface of a wool sweater washed according to the conventional method.

Figure 13(1) is a perspective view of the folded laundry and the auxiliary utensil for laundry in the third embodiment of the present invention and Figure 13(2) is a perspective view of the folded laundry and auxiliary utensil for laundry in the fourth embodiment of the present invention.

Figure 14(1) is a perspective view of the folded laundry and the auxiliary utensil for laundry in the fifth embodiment of the present invention and Figure 14(2) is a perspective view of the folded laundry and the auxiliary utensil for laundry in the sixth embodiment of the present invention.

Figure 15(1) is a perspective view of the folded laundry and the auxiliary utensil for laundry in the seventh embodiment of the present invention and Figure 15(2) is a perspective view of the folded laundry and the auxiliary utensil for laundry in the eighth embodiment of the present invention.

Figure 16 is a partial perspective view of the water-permeable member in the ninth embodiment of the present invention.

Figure 17 is a partial cross section view of the water-permeable member in the ninth embodiment of the present invention.

#### Embodiment of the present invention

The first embodiment of the present invention will be explained below by referring to Figures 1-7.

Auxiliary utensil (1) for laundry shown in Figure 1 is provided with water-permeable member (2) which has flexibility and can compose a space for storing laundry. This water-permeable member (2) is rectangular viewing from the top and the dimension in the longitudinal direction thereof is approximately double the dimension in the short direction. This water-permeable member (2) can be folded into two along the short direction at the center of the

longitudinal direction. Trimming part (3) made of fabric is attached at the periphery of this water-permeable member (2). Fastener (4) is attached to this trimming part (3). The major section between the periphery of water-permeable member (2) folded into two is closed with this fastener (4). Consequently, water-permeable member (2) is composed into a bag shape as shown in Figure 2. The inside part of this bag-shaped water-permeable member (2) composes a storage space for laundry (10). Laundry (10) is superimposed to water-permeable member (2) by being stored in this storage space.

A cylindrical hanger (core material) (8) can be coupled to this water-permeable member (2). Namely, this hanger (8) is inserted into ring (7) made of a fabric stitched to trimming part (3). Laundry (10) stored in the storage space can be hung on this hanger (8). Hanging ring (9) made of fabric is stitched to trimming part (3) so that a clothes line, pole, etc., for drying laundry (10) can be inserted.

As shown in Figure 3, water-permeable member (2) has net (31) on the front surface which has flexibility, net (32) on the back surface which has flexibility and arranged by providing a distance from net (31) on the front surface, and multiple linear parts (33) capable of elastically flexing and deforming. One end of each linear part (33) is coupled to net (31) on the front surface and the other end of each linear part (33) is coupled to net (32) on the back surface. Consequently, nets (31) and (32) can be elastically displaced with respect to each other. Namely, distance (D) of nets (31) and (32) in a state of not being elastically deformed as shown in Figure 4(1) is narrowed according to elastic flexing of linear parts (33) as shown in Figure 4(2). Space (35) is mutually formed between linear parts (33).

The mesh shape of nets (31) and (32) is hexagonal in this embodiment but it is not particularly restricted. All that is necessary as nets (31) and (32) is to have flexibility, but it is preferable to have a suitable softness so as not to damage the laundry. In this embodiment, nets (31) and (32) are composed by knitting yarns which [are] twisted multiple strands of synthetic resin filaments. All that is necessary as linear parts (33) is to be able to elastically flex and deform. In this embodiment, each linear part (33) is composed by mutually coupling a synthetic resin filament alternately to net (31) on the front surface and net (32) on the back surface. The synthetic resin filament composing linear parts (33) is thicker and has greater rigidity than the synthetic resin filament composing nets (31) and (32).

By storing laundry (10) in the storage space, water-permeable member (2) and laundry (10) are superimposed. As shown in Figure 5, water-permeable member (2) and laundry (10) are wound together in a state of having been superimposed. Consequently, water-permeable member (2) and laundry (10) take on a roll shape as shown in Figure 6. At this time, it is possible to wind laundry (10) and water-permeable member (2) with aforementioned hanger (8) as the center axis. As shown in Figure 8, it is possible to wind laundry (10) and water-permeable member (2) into

two rolls. It is preferable to wind laundry (10) and water-permeable member (2) into at least three layers.

As shown in Figure 6, net-shaped rubber band (15) which has water permeability is wound on water-permeable member (2) and laundry (10) which are wound into a roll shape. As a consequence, unfolding of laundry (10) and water-permeable member (2) wound into a roll shape is prevented. This rubber band (15) can be separate from water-permeable member (2), or it can be coupled to water-permeable member (2) as indicated with the alternate long and two short dashed lines in Figures 1 and 2.

The unfolding-preventing means of laundry (10) and water-permeable member (2) wound into a roll shape is not restricted in particular. For example, button, hook, cord, planar fastener, rubber, pin, zipper, clothes pin, etc., can be used. For example, female part (16a) of a planar fastener is provided to one surface of band main body (16) and male part (16b) of a planar fastener [is provided] to the other surface as shown in Figure 9(1). Attachment-coupling means (17a) which has multiple openings capable of inserting one end of band main body (17) to the other end of band main body (17) as shown in Figure 9(2). Female coupling means (18a) is attached to one end of band main body (18) and detachable male coupling means (18b) is attached to the other end of female coupling means (18a) as shown in Figure 9(3). Each unfolding-preventing means has a net-shaped structure, etc., so as to have water permeability. Consequently, a drop in the wash force can be prevented.

By using aforementioned auxiliary utensil (1) for laundry, laundry (10) and water-permeable member (2) can be wound together into a roll shape in the superimposed state, then unfolding of laundry (10) and water-permeable member (2) is prevented with rubber band (15), then laundry (10) and water-permeable member (12) wound into a roll shape is washed thereafter in washing machine (20) as shown in Figure 6.

Consequently, laundry (10) is washed in a state of having been wound into a roll shape so it is possible to prevent laundry (10) from being unevenly biased, becoming rounded, the shape being lost, and shrinkage during the washing in washing machine (20).

Also, the inner circumferential side and the outer circumferential side of rolled laundry (10) directly contact when only laundry (10) is wound into a roll and washed. In this case, sufficient wash force cannot be manifested due to the water flow reaching the center of laundry (10) being insufficient. On the contrary, according to the aforementioned constitution, laundry (10) and water-permeable member (2) are wound into a roll shape in the superimposed state so water-permeable member (2) is interposed between inner circumferential side (10a) and outer circumferential side (10b) of rolled laundry (10) as shown in Figure 7. Consequently, sufficient washing effect can be manifested since the water flow reaching the center of laundry (10) becomes sufficient. Furthermore, laundry (10) and water-permeable member (2) are wound

together so laundry (10) is not abraded by water-permeable member (2). Consequently, generation of damage, pilling, and fuzz in laundry (10) can be prevented.

Water-permeable member (2) composes a storage space. By laundry (10) being stored in this storage space, laundry (10) and water-permeable member (2) are superimposed. Laundry (10) and water-permeable member (2) are wound into a roll shape in this superimposed state so water-permeable member (2) is placed reliably between inner circumferential side (10a) and outer circumferential side (10b) of rolled laundry (10). Consequently, sufficient washing effect can be reliably manifested.

Figure 10 shows auxiliary utensil (1') for laundry in the second embodiment of the present invention. The difference from the first embodiment is that male button (4a) and female button (4b) are attached to both edges along the short direction of trimming part (3) instead of fastener (4). Also, hanger (8) is coupled at approximately the center position in the longitudinal direction of water-permeable member (2). This water-permeable member (2) is folded along the short direction at a position of about  $\frac{1}{4}$  from one end in the longitudinal direction thereof and at a position of about  $\frac{1}{4}$  from the other end in the longitudinal direction. The two edges along the short direction of water-permeable member (2) are mutually coupled via buttons (4a) and (4b). Consequently, laundry (10) and water-permeable member (2) are superimposed then wound into a roll shape. The rest is the same as the first embodiment and the same parts are indicated with the same symbols.

Figure 13(1) shows the third embodiment of the present invention. In this third embodiment, auxiliary utensils (1) and (1') for laundry similar to the first embodiment or the second embodiment are used. The difference from the first and second embodiments is that laundry (10) stored in the storage space and water-permeable member (2) superimposed to laundry (10) are folded together so that two folds (50) are created instead of being wound into a roll shape. Unfolding of this folded laundry (10) and water-permeable member (2) is restricted with a restricting means such as rubber band, etc., similar to the first embodiment. Laundry (10) is washed along with water-permeable member (2) in this folded state in a washing machine. Folds (50) are mutually arranged at a parallel. Also, the trough side of one fold (50) is arranged on one surface of water-permeable member (2) and the trough side of other fold (50) is arranged on the side opposite from the one surface of water-permeable member (2). The rest is composed in the same manner as the aforementioned embodiments and the same parts are indicated with the same codes.

Figure 13(2) shows the fourth embodiment of the present invention. The difference from the third embodiment is that the trough sides of the two mutually parallel folds (50) are arranged on the same surface of water-permeable member (2). The rest is the same as the third embodiment.

Figure 14(1) shows the fifth embodiment of the present invention. The difference from the third embodiment is that the number of mutually parallel folds (50) is three. Also, one trough side of the mutually adjacent folds (50) is arranged on one surface of water-permeable member (2) and the other trough side is arranged on the side opposite from the one surface of water-permeable member (2). The rest is the same as the third embodiment.

Figure 14(2) shows the sixth embodiment of the present invention. The difference from the fifth embodiment is that the trough side of the mutually adjacent folds (50) are both arranged on the same surface of water-permeable member (2). The rest is the same as the fifth embodiment.

Figure 15(1) shows the seventh embodiment of the present invention. The difference from the third embodiment is that the number of mutually parallel folds (50) is four. Also, one trough side of the mutually adjacent folds (50) is arranged on one surface of water-permeable member (2) and the other trough side is arranged on side opposite of the one surface of water-permeable member (2). The rest is the same as the third embodiment.

Figure 15(2) shows the eighth embodiment of the present invention. The difference from the third embodiment is that the folds (50) are formed on two straight lines which cross in the unfolded state of water-permeable member (2) and laundry (10). The trough side of fold (50) on one straight line is arranged on one surface of water-permeable member (2). Fold (50) on the other straight line is divided into two at the center point and one trough side of this divided fold (50) is arranged on one surface of water-permeable member (2) and the other trough side is arranged on the side opposite of the one surface of water-permeable member (2). The rest is the same as the third embodiment.

According to the third to eighth embodiments, laundry (10) is washed in a folded state so that not less than two folds are created. Consequently, laundry (10) being unevenly biased, becoming rounded, losing its shape, and shrinking can be prevented when washed in a washing machine. Also, when only laundry (10) is folded and washed, the opposing surfaces of laundry (10) which was folded contact directly, thus water flow reaching the center of laundry (10) becomes insufficient. Consequently, sufficient washing effect cannot be manifested. On the contrary, according to the aforementioned constitution, laundry (10) and water-permeable member (2) are folded in the superimposed state so water-permeable member (2) is placed between the opposing surfaces thereof. Therefore, water flow reaching the center of laundry (10) does not become insufficient and sufficient washing effect can be manifested. Furthermore, laundry (10) and water-permeable member (2) are folded together so laundry (10) is not abraded by water-permeable member (2). Consequently, generation of damage, pilling, and fuzz in laundry (10) can be prevented. Also, water-permeable member (2) and laundry (10) stored in the storage space composed from water-permeable member (2) are folded. Consequently, water-



permeable member (2) is placed reliably between the opposing surfaces of folded laundry (10) so sufficient washing effect can be reliably manifested.

Water-permeable member (2) in the aforementioned embodiments is composed by coupling net (31) on the front surface which has flexibility and net (32) on the back surface which has flexibility and arranged by being distanced from net (31) on the front surface to be elastically displaceable with respect to each other. Therefore, in the first and second embodiments, front surface net (31) relatively elastically displaces with respect to back surface net (32) due to the impact from the water flow or centrifugal force during the dewatering functioning on water-permeable member (2) which covers the outer most circumferential section of rolled laundry (10). Consequently, relative movement of back surface net (32) with respect to laundry (10) can be suppressed. Also, in the third to eighth embodiments, front surface net (31) relatively elastically displaces with respect to back surface net (32) due to the impact from the water flow or centrifugal force during the dewatering functioning on water-permeable member (2) which covers the outer most side section of folded laundry (10). Consequently, relative movement of back surface net (32) with respect to laundry (10) can be suppressed. Therefore, it is possible to prevent the outer most peripheral section of folded laundry (10) in the first and second embodiments and the outer most side section of folded laundry (10) in third to eighth embodiments from being abraded by net (31) and generation of damage, pilling, and fuzz can be prevented.

The coupling means for front surface net (31) and back surface net (32) is composed from multiple linear parts (33) capable of elastically flexing and deforming. One end of each linear part (33) is coupled to front surface net (31) and the other end is coupled to back surface net (32). Therefore, nets (31) and (32) are made elastically displaceable with respect to each other and space (35) is mutually formed between linear parts (33). Consequently, the water flow can pass through space (35) between front surface net (31) and back surface net (32) so the washing effect can be improved.

In the first and second embodiments, laundry (10) and water-permeable member (2) are wound into a roll shape with hanger (8) as the center axis. Consequently, laundry (10) and water-permeable member (2) can be wound easily into a roll shape.

It is possible to use auxiliary utensils (1) and (1') for laundry similar to the first and second embodiments, superimpose water-permeable member (2) and laundry (10) by storing laundry (10) in the storage space, fold laundry (10) and water-permeable member (2) together in this superimposed state so that at least one fold is created, wind the folded laundry and water-permeable member together into a roll shape, restrict unfolding of laundry (10) and water-permeable member (2) wound into a roll shape with a restricting means, such as a rubber band, etc., similar to the first embodiment, and wash both laundry (10) and water-permeable member

(2) in a washing machine in this state of having been folded and wound into a roll shape. By this method, it is possible to manifest the same effects as the aforementioned embodiments.

Also, it is possible to use water-permeable member (102) in the ninth embodiment shown in Figures 16 and 17 instead of the aforementioned water-permeable member (2). This water-permeable member (102) is composed of net (131) which has flexibility and multiple linear parts (133) which are capable of elastically flexing and deforming and coupled to one surface of net (131). This linear part (133) is composed into a ring shape by both ends being coupled to net (131). A space is mutually formed between linear parts (133). When composing the inside part of this water-permeable member (102) into a space for storing laundry, the linear part (133) side thereof becomes the inside. Consequently, the linear part (133) side contacts laundry (10) stored in the storage space and laundry (10) and water-permeable member (102) are superimposed.

The mesh shape of this net (131) is composed into a diamond shape in this embodiment but it is not particularly restricted. All that is necessary for net (131) is to be a net which has flexibility but which has a suitable softness which does not damage the laundry is preferable. In this embodiment, net (131) is composed by knitting a yarn which [is] twisted multiple strands of synthetic resin filaments. All that is necessary for linear part (133) is to be able to elastically flex and deform. In this embodiment, linear part (133) is composed by coupling both ends of a synthetic resin filament which is thicker and has greater rigidity than the synthetic resin filament composing net (131) to net (131).

The present invention is not restricted to the aforementioned embodiments. For example, the mesh shape of the net composing water-permeable member (2) is not restricted in particular.

#### Application Example 1

In order to compare the wash force of the laundering method in the present invention and the conventional laundering method, 10 sheets of wet artificially contaminated cloths made by the Association of Laundry Science were stitched to an apparel (wool sweater) and these 10 sheets of artificially contaminated cloths and apparel were washed in the following conditions with a fully automated washing machine (made by Matsushita Electric Industrial Co., Ltd. NA-F60K1).

(Washing condition)

Concentration of detergent: 0.14 wt %

Detergent used: Marketed liquid detergent

Water temperature: 20°C

Water hardness: 4° DH

Washing course: Standard course

Drying: 20°C, 65% RH, flat drying

The laundering method was 1-4 below.

Laundering method 1: The laundry was washed as is without using an auxiliary utensil for laundry.

Laundering method 2: Auxiliary utensil (1) for laundry in the first embodiment was used, water-permeable member (2) and laundry (10) were wound together into a roll shape in the superimposed state like in the first embodiment, unfolding of water-permeable member (2) and laundry (10) wound into a roll shape was restricted, and water-permeable member (2) and laundry (10) were both washed in the washing machine in this restricted state. The thickness of water-permeable member (2) was 4.0 mm.

Laundering method 3: Using an auxiliary utensil for laundry with the same constitution as the first embodiment, except for using a water-permeable member composed from one layer of net instead of water-permeable member (2) in the first embodiment, the water-permeable member and laundry (10) were superimposed, the water-permeable member and laundry (10) were wound together into a roll shape in this superimposed state, unfolding of the water-permeable member and the laundry wound into a roll shape was restricted, and both the water-permeable member and the laundry were washed in the washing machine in this restricted state. The thickness of one layer of net which is the water-permeable member was 2.2 mm.

Laundering method 4: Only laundry (10) was wound into a roll shape as shown in Figure 11(1), laundry (10) wound into a roll shape was stored in bag-shaped auxiliary utensil (50) for laundry composed of one layer of net, and was washed in the washing machine in a state of having closed the opening of auxiliary utensil (50) for laundry with fastener (52) as shown in Figure 11(2).

Laundering method 5: Using an auxiliary utensil for laundry with the same constitution as the first embodiment, except for using a water-permeable member composed of one layer of net instead of water-permeable member (2) in the first embodiment, the water-permeable member and laundry (10) were superimposed, the water-permeable member and laundry (10) were wound together into a roll shape in the superimposed state, unfolding of the water-permeable member and the laundry wound into a roll shape was restricted, and the water-permeable member and the laundry were both washed in the washing machine in this restricted state. The thickness of one layer of net which is the water-permeable member was 0.75 mm.

The reflectivity in 550 nm of contaminated cloth before and after the washing and the original cloth before the contamination were measured with a color difference meter (Z-300A made by Nippon Denshoku K.K.) and the wash rate (%) was obtained with the following equation. This wash rate corresponds to wash force.

Wash rate =  $100 \times (\text{reflectivity of contaminated cloth after washing} - \text{reflectivity of unwashed contaminated cloth}) / (\text{reflectivity of white cloth (before contamination)} - \text{reflectivity of unwashed contaminated cloth})$

The average wash rate for 10 sheets of contaminated cloths according to each laundering method was as follows.

Laundering method 1 ... 18%

Laundering method 2 ... 15%

Laundering method 3 ... 12%

Laundering method 4 ... 8%

Laundering method 5 ... 8.5%

### Application Example 2

In order to compare the extent of shrinkage in the laundry in the laundering method of the present invention and the conventional laundering method, washing was executed in the same manner as laundering methods 1-4 in Application Example 1 in the following washing conditions, using wool sweater adjusted as follows as the test cloth, and the rate of area shrinkage was obtained.

#### (1) Preparation of the test cloth

Multiple size L wool sweaters were humidity conditioned for more than 12 h at 20°C, 65% RH. Marks were applied to each wool sweater at four locations with an oil-based sign pen so as to become a square in which one side is 15 cm. A number was noted on each wool sweater. The length in the lateral direction and the length in the vertical direction between the respective marks were measured and each length was considered as the original length. Since multiple wool sweaters were used, the horizontal direction and vertical direction were cut from the weaving direction of the fibers so as to be coordinated.

#### (2) Washing conditions

Using a fully automated washing machine (NA-F60K1 model made by Matsushita Electric Industrial Co., Ltd.), each of the wool sweaters prepared in (1) above was washed according to the standard course. The concentration of the detergent was 0.14 wt % and the water temperature was 20°C. After completing the wash, it was dried and moisture conditioned for 24 h at 20°C, 65% RH. Thereafter, the lengths were measured again regarding the marks applied in (1) above and the rate of shrinkage was calculated from these values. Furthermore, the rate of area shrinkage was obtained. The rate of shrinkage was obtained separately for the vertical direction and the horizontal direction.

The rate of shrinkage and rate of area shrinkage were calculated according to the following equations. In each wool sweater, the measured value (original length) before the wash was considered as R.M., the measured value of after the wash as W.M, and the average values of the measured results were used. Also, in the rate of shrinkage, the rate of shrinkage in the horizontal direction in each sweater was considered as W.S. and the rate of shrinkage in the vertical direction as L.S.

(Calculation for rate of shrinkage)

$$\text{Rate of shrinkage (\%)} = 100 \times (\text{R.M.} - \text{W.M.}) / \text{R.M.}$$

(Calculation of rate of area shrinkage)

$$\text{Rate of area shrinkage (\%)} = (\text{W.S.} + \text{L.S.}) - (\text{W.S.} \times \text{L.S.}) / 100$$

The rate of area shrinkage according to each laundering method was as follows.

Laundering method 1 ... 15.2%

Laundering method 2 ... 2.8%

Laundering method 3 ... 3.1%

Laundering method 4 ... 3.0%

### Application Example 3

In order to compare the generation of fuzz in the laundry in the laundering method of the present invention and the conventional laundering method, wash was executed in a double-tub washing machine for 3 min at a water temperature of 20°C and in weak water flow and 1 min of rinsing according to laundering methods 1 and 2 in the aforementioned Application Example 1, 30 sec of dewatering was executed twice, and after completing the wash, it was dried at 20°C, 65% RH and the surface state was compared.

Figure 12(1) shows the surface state (magnification of 22.5) of the wool sweater washed according to laundering method 2 of the present invention and Figure 12(2) shows the surface state (magnification of 22.5) of the wool sweater washed according to the conventional laundering method 1.

### Application Example 4

In order to compare the generation of a crease in the laundering method of the present invention and the conventional laundering method, a wool sweater was washed in the same washing conditions as Application Example 1 with a fully automated washing machine (NA-F60K1 made by Matsushita Electric Industrial Co., Ltd.)

The laundering method below was 1-3.

Laundering method 1: Laundry was placed in the auxiliary utensil for laundry in the first embodiment and was washed as is without being folded or wound into a roll shape.

Laundering method 2: Laundry was placed in auxiliary utensil (1) for laundry in the first embodiment, the laundry and the water-permeable member were folded together so that a least two folds are created in the superimposed state, unfolding of the folded laundry and water-permeable member was restricted, and the laundry and the water-permeable member were both washed in the washing machine in this restricted state in the same manner as the fourth embodiment shown in Figure 13(2).

Laundering method 3: Laundry was placed in auxiliary utensil (1) for laundry in the first embodiment, the laundry and the water-permeable member were folded together so that three folds are created in the superimposed state, unfolding of the folded laundry and water-permeable member was restricted, and laundry and the water-permeable member were both washed in the washing machine in this restricted state in the same manner as the sixth embodiment shown in Figure 14(2).

In laundering method 1, creases were created throughout the laundry. On the contrary, in laundering methods 2 and 3 related to the present invention, there was only a slight crease which did not stand out. Also, in laundering methods 2 and 3, there was less of a crease in laundering method 3 which had a greater number of folds.

#### Application Example 5

In order to compare the shrinkage in the laundry in the laundering method of the present invention and the conventional laundering method, washing was executed in the same manner as laundering methods 1-3 in Application Example 4 at the same washing conditions as Application Example 2 using a wool sweater adjusted in the same manner as in Application Example 2 and the rate of area shrinkage was obtained in the same manner as in Application Example 2.

The rate of area shrinkage according to each laundering method was as follows.

Laundering method 1 ... 8%

Laundering method 2 ... 4%

Laundering method 3 ... 3%

From the aforementioned Application Example 1, it is possible to recognize that in laundering methods 2 and 3 of the present invention, a drop in the wash force is minimal from laundering method 1, which does not use an auxiliary utensil for laundry, and sufficient wash force is manifested when compared with laundering method 4, which only wound the laundry into a roll shape and stored it in the auxiliary utensil for laundry.

Also, from the aforementioned Application Example 2, it is possible to recognize that in laundering methods 2 and 3 of the present invention, the shrinkage of the laundry is greatly improved compared to laundering method 1, which does not use an auxiliary utensil for laundry.

Also, from the aforementioned Application Example 3, it is possible to recognize that in laundering method 2 of the present invention, generation of fuzz in the laundry is greatly improved compared to laundering method 1, which does not use an auxiliary utensil for laundry.

Also, from the aforementioned Application Example 4, it was recognized that in laundering methods 2 and 3 of the present invention, it is possible to reduce the generation of creases and prevent uneven biasing when compared with conventional laundering method 1, which simply places the laundry in the auxiliary utensil for laundry by folding the laundry and the water-permeable member and restricting the movement of laundry with respect to the auxiliary utensil for laundry with the folds.

Also, from the aforementioned Application Example 5, it is possible to recognize that in laundering methods 2 and 3 of the present invention, shrinkage of the laundry is greatly improved compared with laundering method 1, which simply places the laundry in the auxiliary utensil for laundry.

### Claims

1. A laundry method characterized by the fact that, when superimposing laundry and a water-permeable member capable of composing a space for holding the laundry by holding the laundry in the storage space thereof, integrally winding this into a roll shape in the superimposed state, and washing the laundry and the water-permeable member in a washing machine in a state of having been wound into a roll shape, the water-permeable member is composed by coupling flexible net on the front surface and flexible net on the back surface arranged by being separated from the net on the front surface so as to be elastically displaceable relatively.
2. A laundry method noted in Claim 1 in which the coupling means of the net on the front surface and the net on the back surface is composed of several linear parts capable of elastically flexing and deforming, the two nets are made relatively elastically displaceable by one end of each linear part being coupled to the net on the front surface and the other end being coupled to the net on the back surface, forming a space between the linear parts.
3. A laundry method characterized by the fact that, when superimposing the laundry and the water-permeable member capable of composing a space for holding the laundry by holding the laundry in the storage space thereof, integrally winding into a roll shape in the superimposed state, and washing the laundry and the water-permeable member in a washing machine in a state of having been wound into a roll shape, the water-permeable member is composed of net having flexibility and several linear parts capable of elastically flexing and deforming and coupled to

one surface of this net, a space is formed between the linear parts, and the laundry and the water-permeable member are superimposed so that the linear part side contacts the laundry.

4. A laundry method noted in Claim 3, in which the linear parts are composed into a ring shape by their two ends being coupled to the net.

5. A laundry method noted in one of Claims 1-4, which integrally folds the laundry and the water-permeable member in the superimposed state so that at least one fold is created and winds the folded laundry and the water-permeable member into a roll shape.

6. A laundry method noted in Claim 1 or 3, which winds the laundry and the water-permeable member into a roll shape with the core material as the center shaft.

7. A laundry method characterized by the fact that, when superimposing laundry and a water-permeable member capable of composing a space for holding the laundry by holding the laundry in the storage space thereof, integrally folding in the superimposed state so that not less than two folds are created, and washing the laundry and the water-permeable member in a washing machine in the folded state, the water-permeable member is composed by coupling the flexible net on the front surface and flexible net on the back surface arranged by being separated from the net on the front surface so as to be elastically displaceable with respect to each other.

8. A laundry method noted in Claim 7, in which the coupling means of the net on the front surface and the net on the back surface is composed of several linear parts capable of elastically flexing and deforming, the two nets are made relatively elastically displaceable by one end of each linear part being coupled to the net on the front surface and the other end being coupled to the net on the back surface, and a space is mutually formed between the linear parts.

9. A laundry method characterized by the fact that, when superimposing laundry and a water-permeable member capable of composing a space for holding the laundry by holding the laundry in the storage space thereof, integrally folding in the superimposed state so that not less than two folds are created, and washing the laundry and the water-permeable member in a washing machine in the folded state, the water-permeable member is composed from flexible net and several linear parts capable of elastically flexing and deforming and coupled to one surface of the net, a space is formed between the linear parts, and the laundry and the water-permeable member are superimposed so that the linear part side contacts the laundry.

10. A laundry method noted in Claim 9, in which the linear parts are composed into a ring shape by the two ends being coupled to the net.

11. An auxiliary utensil for laundry characterized by the fact that a water-permeable member capable of composing a space for holding laundry is provided, the water-permeable member has flexibility so that the laundry held in the storage space thereof and the water-permeable member can be integrally wound into a roll shape in the superimposed state, a means is provided for preventing the laundry and the water-permeable member wound into a roll shape



from becoming unfolded, and the water-permeable member is composed by coupling flexible net on the front surface and flexible net on the back surface arranged by being separated from the net on the front surface so as to be elastically displaceable with respect to each other.

12. An auxiliary utensil for laundry noted in Claim 11, characterized by the fact that the coupling means of the net on the front surface and the net on the back surface is composed of several linear parts capable of elastically flexing and deforming, the two nets are made elastically displaceable with respect to each other by the one end of each linear part being coupled to the net on the front surface and the other end of each linear part being coupled to the net on the back surface, and a space is formed between the linear parts.

13. An auxiliary utensil for laundry which is provided with a water-permeable member capable of composing a space for holding laundry, the water-permeable member has flexibility so that the laundry held in the storage space and the water-permeable member can be integrally wound into a roll shape in the superimposed state, a means is provided for preventing the laundry and the water-permeable member wound into a roll shape from becoming unfolded, the water-permeable member is composed from flexible net and several linear parts capable of elastically flexing and deforming and coupled to one surface of the net, a space is formed between the linear parts, and each linear part is arranged on the inside of the storage space so that contact can be made with the laundry.

14. An auxiliary utensil for laundry noted in Claim 13, in which the linear parts are composed into a ring shape by their two ends being coupled to the net.

15. An auxiliary utensil for laundry noted in one of Claims 11-14, capable of coupling a core material to the water-permeable member so as to become the center shaft when winding the laundry and the water-permeable member into a roll shape.

16. An auxiliary utensil for laundry noted in Claim 11 or 13, capable of integrally folding the water-permeable member and the laundry so that at least one fold is created in the superimposed state and capable of winding into a roll shape in the folded state.

17. An auxiliary utensil for laundry characterized by the fact that a water-permeable member capable of composing a space for holding laundry is provided, the water-permeable member has flexibility so that the laundry held in the storage space and the water-permeable member can be integrally folded so that not less than two folds are created in the superimposed state, a means is provided for regulating the folded laundry and water-permeable member from becoming unfolded, and the water-permeable member is composed by coupling flexible net on the front surface and flexible net on the back surface arranged by being separated from the net on the front surface so as to be elastically displaceable with respect to each other.

18. An auxiliary utensil for laundry noted in Claim 17, characterized by the fact that the coupling means of the net on the front surface and the net on the back surface is composed of

several linear parts capable of elastically flexing and deforming, the two nets are made elastically displaceable with respect to each other by one end of each linear part being coupled to the net on the front surface and the other end of each linear part being coupled to the net on the back surface, and a space is formed between the linear parts.

19. An auxiliary utensil for laundry which is provided with a water-permeable member capable of composing a space for holding laundry, the water-permeable member has flexibility so that the laundry held in the storage space and the water-permeable member can be integrally folded so that not less than two folds are created in the superimposed state, a means is provided for regulating the folded laundry and the water-permeable member from becoming unfolded, the water-permeable member is composed of flexible net and several linear parts capable of elastically flexing and deforming and coupled to one surface of the net, a space is formed between the linear parts and each linear part is arranged on the inside of the storage space so that contact can be made with the laundry.

20. An auxiliary utensil for laundry noted in Claim 19 in which the linear parts are composed into a ring shape by their two ends being coupled to the net.

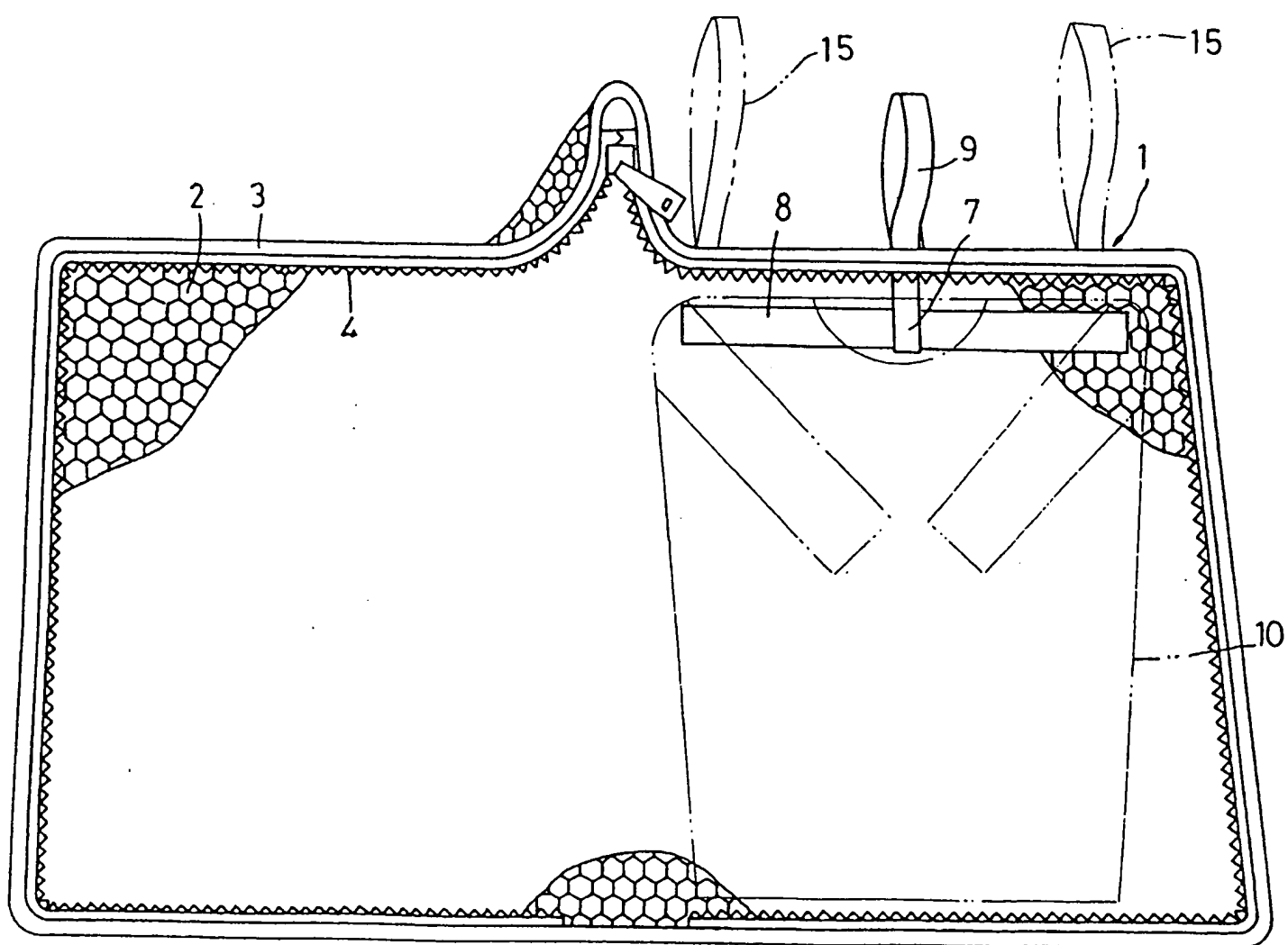


Figure 1

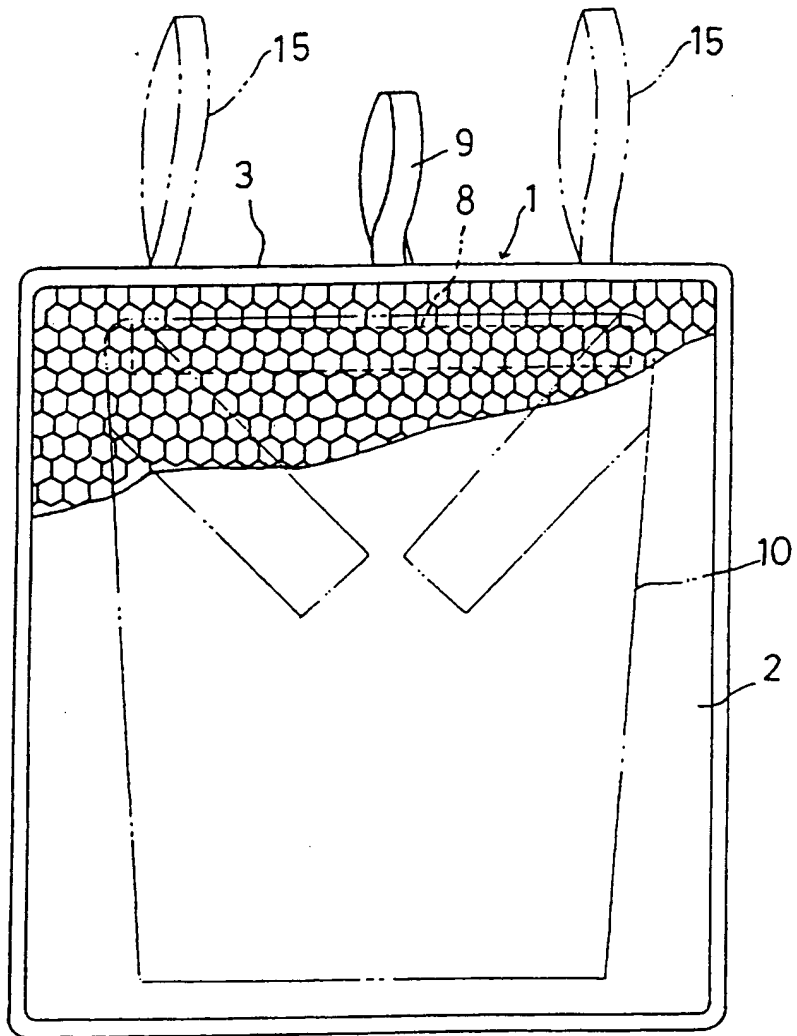


Figure 2

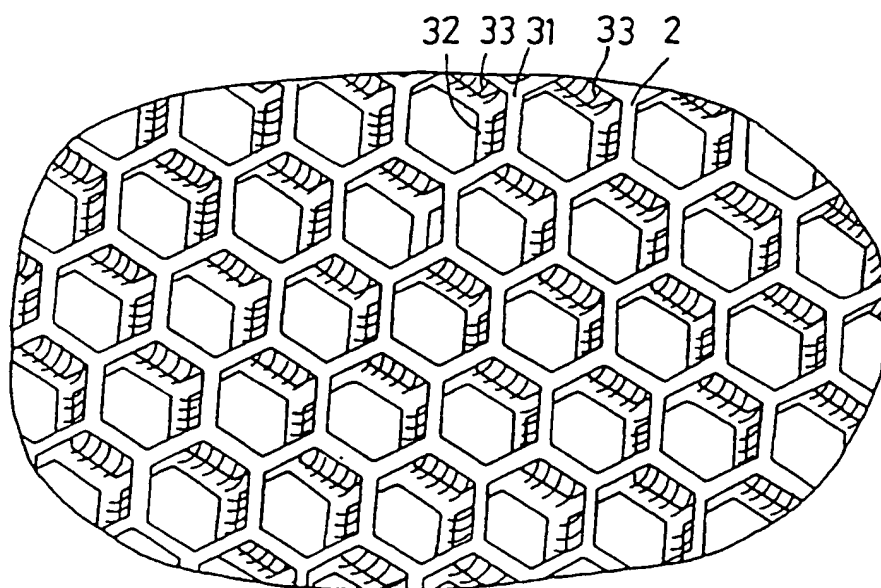


Figure 3

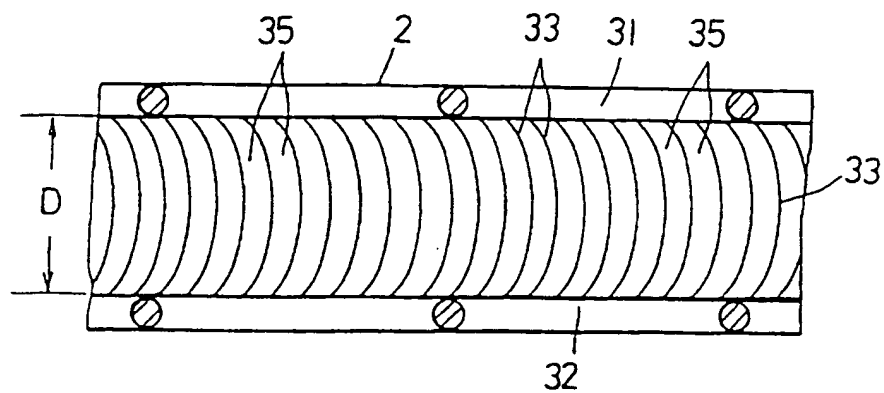


Figure 4 (1)

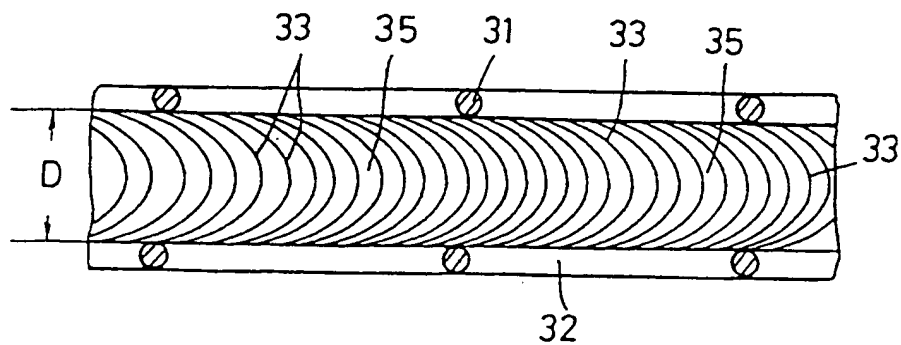


Figure 4 (2)

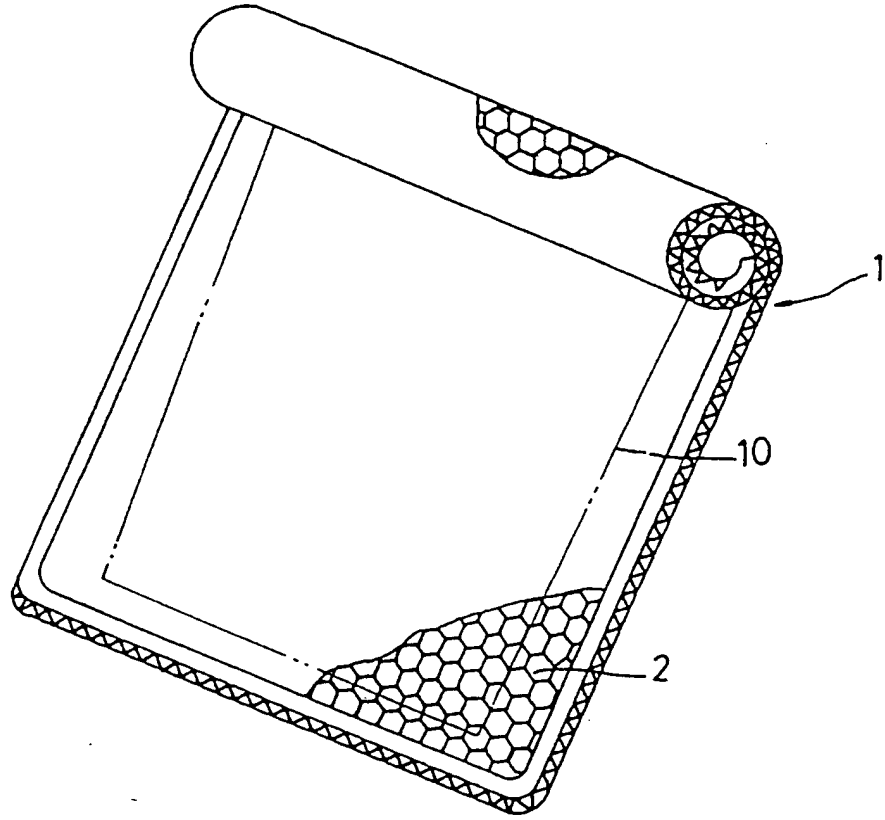


Figure 5

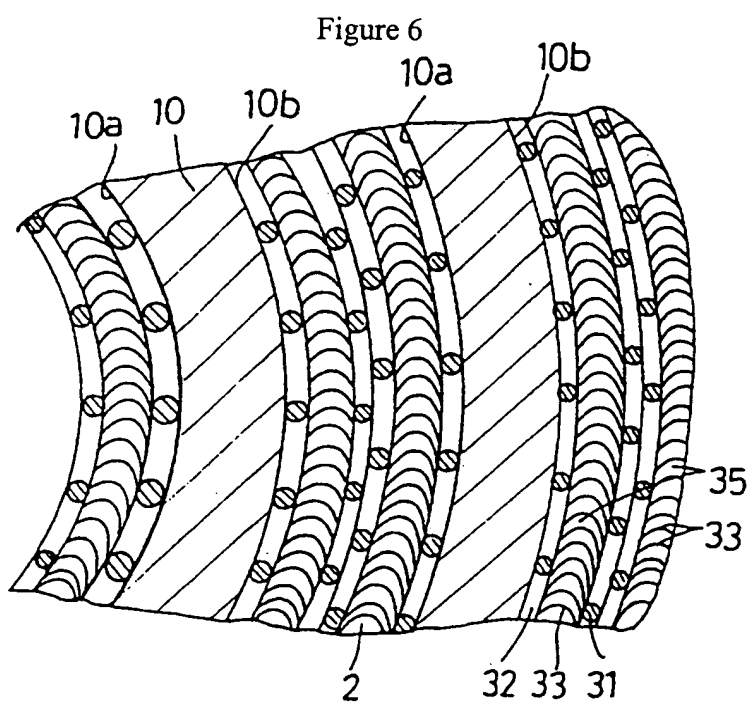
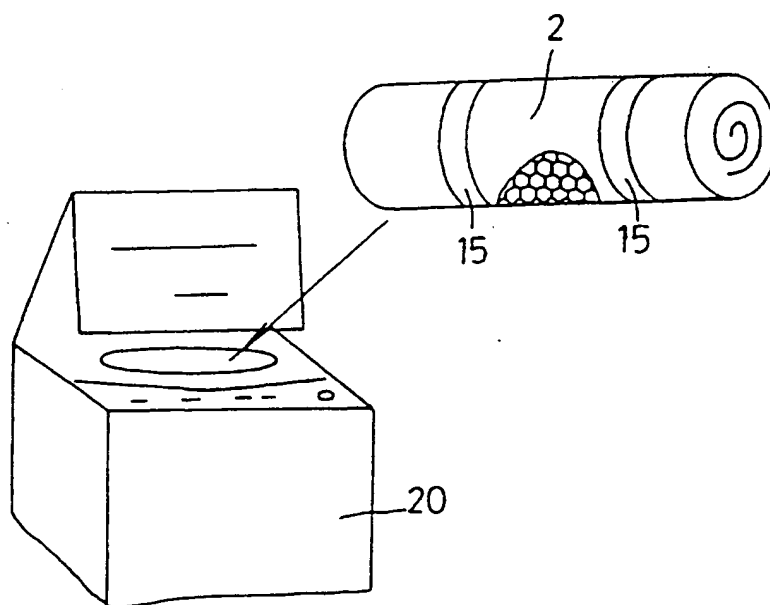


Figure 7



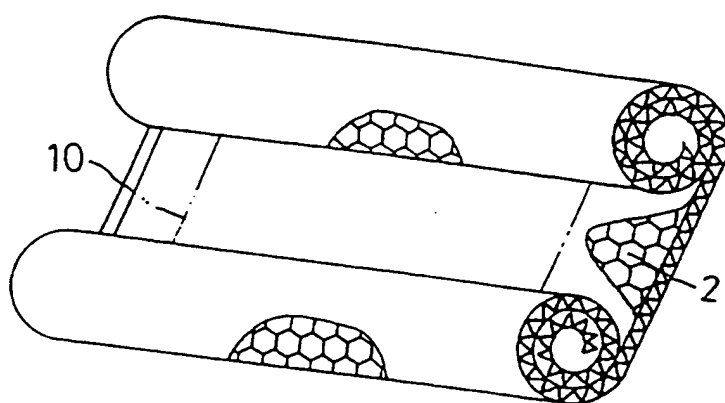


Figure 8

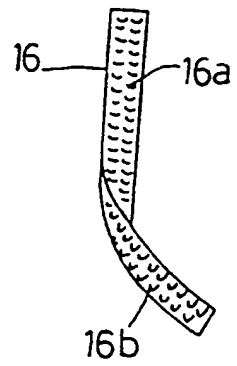


Figure 9 (1)

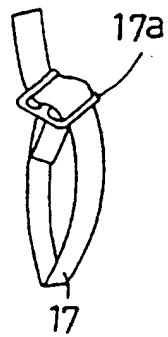


Figure 9 (2)

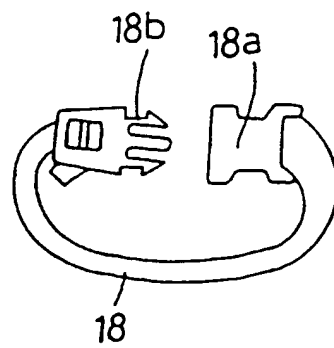


Figure 9 (3)

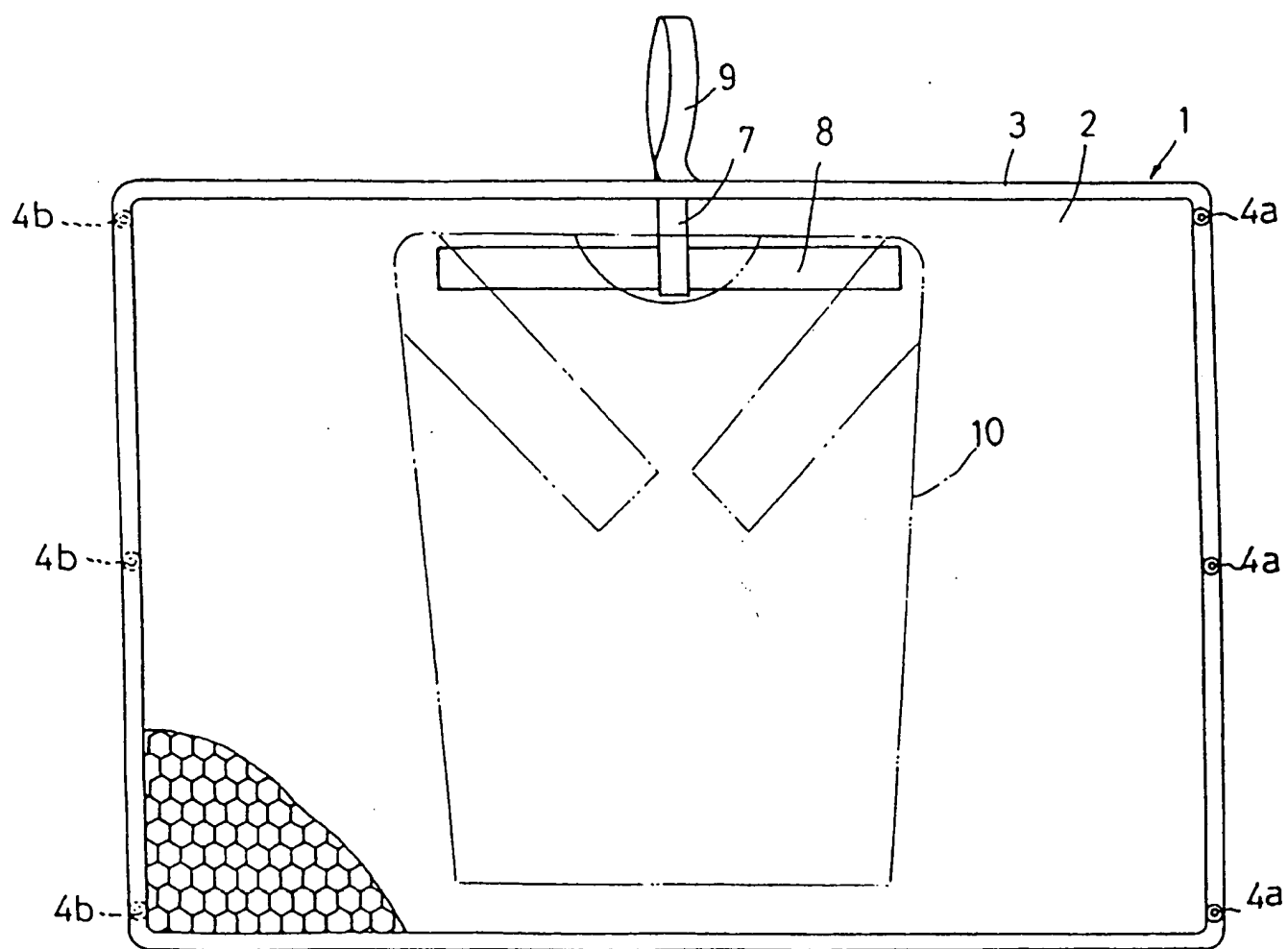


Figure 10

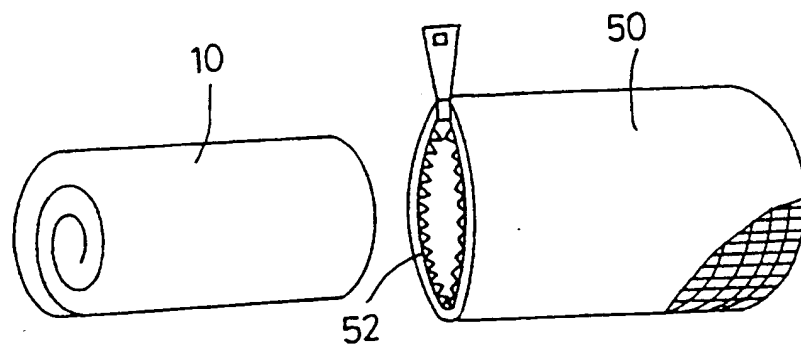


Figure 11 (1)

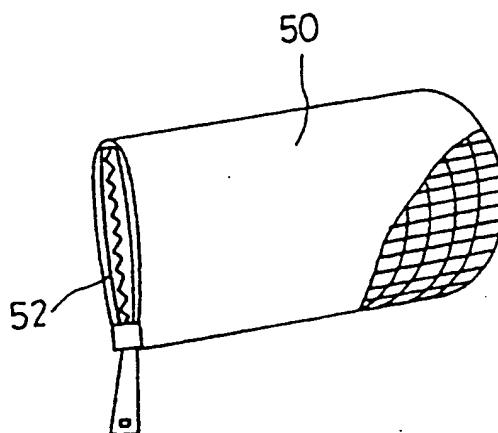


Figure 11 (2)



Figure 12 (1)

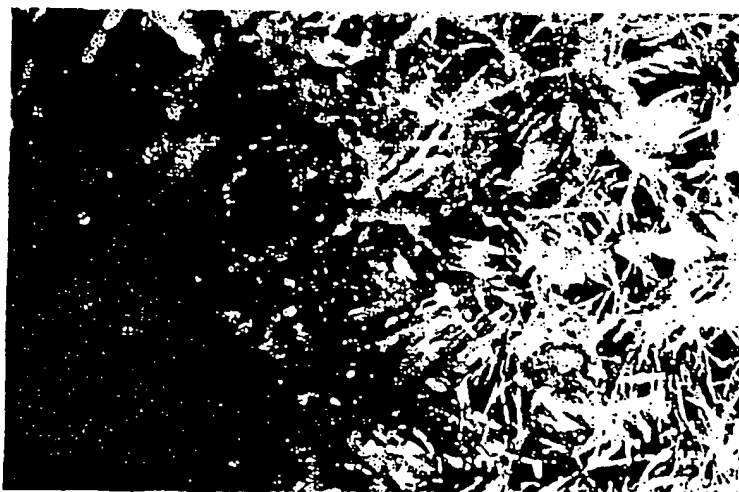


Figure 12 (2)

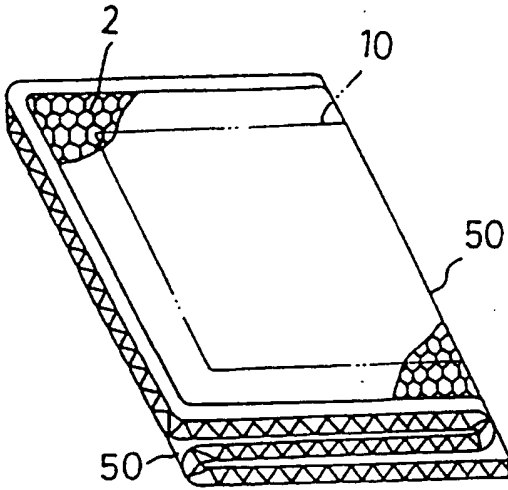


Figure 13 (1)

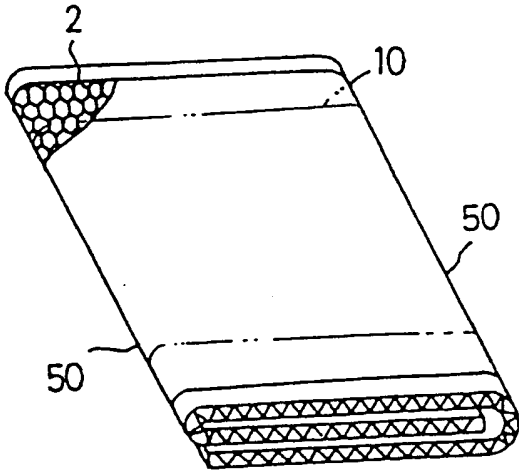


Figure 13 (2)



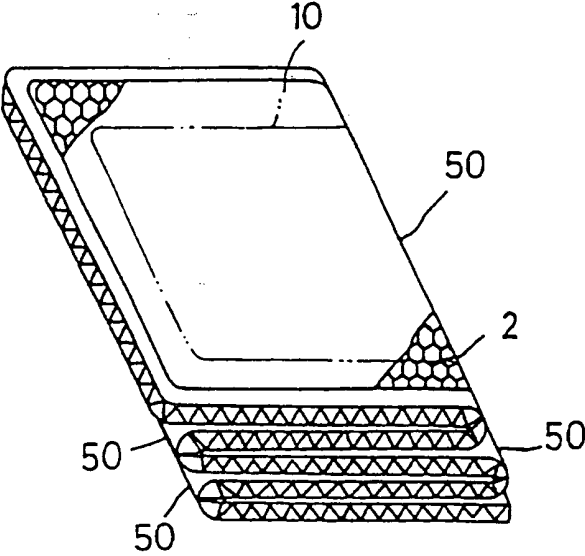


Figure 15 (1)

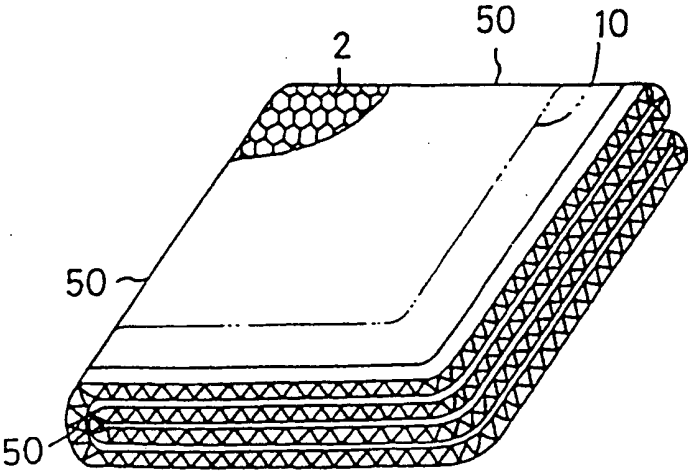


Figure 15 (2)



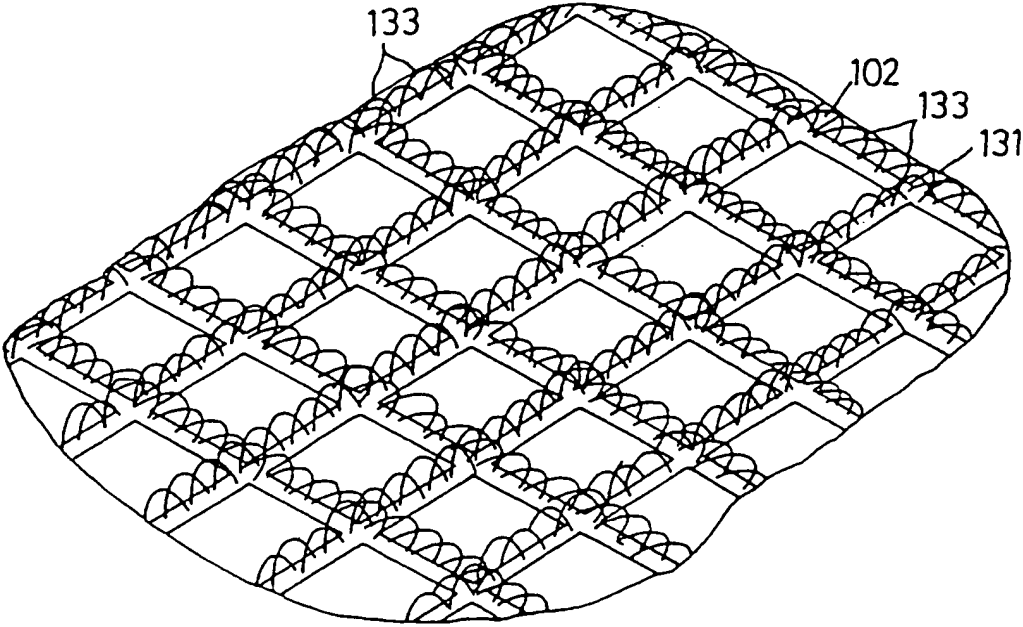


Figure 16

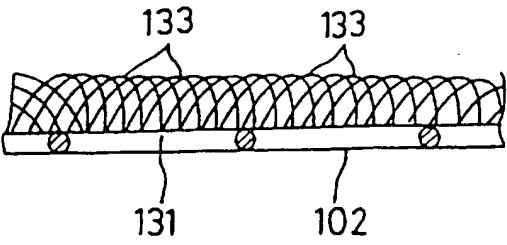


Figure 17

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP97/02538

## A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl<sup>6</sup> D06F35/00, B65D30/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl<sup>6</sup> D06F35/00, B65D30/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1926 - 1997
Kokai Jitsuyo Shinan Koho	1971 - 1995
Toroku Jitsuyo Shinan Koho	1994 - 1997

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP, 6-312084, A (K.K. Daiya Coporeshon), November 8, 1994 (08. 11. 94), Par. No. (0040), lines 1 to 10	1, 2, 7, 8, 11, 12, 17, 18
A	Par. No. (0040), lines 1 to 10 (Family: none)	5, 6, 15, 16
Y	JP, 7-12083, U (Daikoku Kogyo K.K.), February 28, 1995 (28. 02. 95), Par. No. (0007), lines 3 to 5	3, 9, 13, 19
A	Par. No. (0007), lines 3 to 5 (Family: none)	4-6, 10, 14-16, 20
Y	JP, 5-13380, U (Kumiko Sou), February 23, 1993 (23. 02. 93), (Claim 1)	1-3, 11, 12, 13
A	(Claim 1) (Family: none)	4-6, 14-16

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
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Date of the actual completion of the international search October 17, 1997 (17. 10. 97)	Date of mailing of the international search report October 28, 1997 (28. 10. 97)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer  Telephone No.

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP, 7-289778, A (K.K. Sanai), November 7, 1995 (07. 11. 95), Par. No. (0013), lines 1 to 7	7, 8, 9, 17, 18, 19 10, 16, 20
A	Par. No. (0013), lines 1 to 7 (Family: none)	